

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the structure and applications of p8R322 and YAC vectors.
17. Compare and contrast radioactive and non-radioactive labeling of DNA probes, discussing their principles, advantages, and limitations.
18. Discuss the applications and ethical concerns of gene therapy in animals.
19. Explain the mechanisms used in plant biotechnology for delayed fruit ripening and improving crop yield?
20. Explain the principle, steps, and applications of Western blotting technique.



APRIL/MAY 2025

FBC62/CBC62 — BIOTECHNOLOGY

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. How do Type I and Type II restriction enzymes differ in function?
2. What is the function of DNA ligase in recombinant DNA technology?
3. Why are antibiotic resistance genes used in vector selection?
4. How does nucleic acid hybridization detect recombinant clones?
5. Compare transfection and microinjection in gene transfer.
6. Why are knockout mice important in genetic research?



7. Define somaclonal variation and its applications.
8. What is the role of microprojectiles in plant gene transfer?
9. Differentiate between qualitative and quantitative PCR.
10. How does Southern blotting aid in DNA fingerprinting?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

11. (a) Explain the mechanism of action of restriction endonucleases and their significance in genetic engineering?

Or

- (b) Describe the roles of linkers, adapters, and homopolymers in recombinant DNA technology?

12. (a) Discuss about any two methods used to insert recombinant DNA into host cells.

Or

- (b) Discuss various screening techniques used for the selection of recombinant colonies?



13. (a) Explain different methods of gene transfer in animals, highlighting their advantages and limitations?

Or

- (b) Discuss the applications of transgenic animal models in human disease research?

14. (a) Explain how transgenic plants are developed for herbicide tolerance and pest resistance.

Or

- (b) Discuss the role of antisense RNA technology in plant genetic engineering.

15. (a) Describe the steps involved in the Polymerase Chain Reaction (PCR) and its application?

Or

- (b) Compare Maxam-Gilbert and Sanger sequencing methods?